



**Draft Earth Venture Mission – 2  
Announcement of Opportunity  
Technical, Management and Cost Evaluation  
Overview :  
Prospective Bidders Teleconference/WebEx**

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May 29, 2015**



# Outline

Earth Venture Mission-2  
Prospective Bidders  
Teleconference/WebEx

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**Introduction**

**Draft EVM-2 Announcement of Opportunity Highlights**

**Technical, Management, and Cost (TMC) Evaluation**

**References**

**Questions**



# Introduction

## Purpose of this Presentation

1. Present a short overview of the Technical, Management and Cost (TMC) Evaluation of proposals that may be submitted as a result of an Earth Venture Mission - 2 (EVM-2) Announcement of Opportunity (AO).
2. Present some of the Draft EVM-2 AO Highlights
3. Point to reference documents
4. Answer questions

Important Note: This Draft EVM-2 AO is based on SMD's Standard PI-Led Mission AO. However, it incorporates a large number of changes relative to the standard template as well as previous ESSP Program AOs including both policy changes and changes to proposal submission requirements. All proposers must read this AO carefully, and all proposals must comply with the requirements, constraints, and guidelines contained within this AO.



# Draft EVM-2 AO Highlights



# Draft EVM-2 AO: Highlights

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## **5.2.1 Complete Spaceflight Missions**

Requirement 13. Proposals submitted in response to this AO shall be for complete Science investigations requiring a spaceflight mission.

Requirement 14. Proposals shall describe the proposed mission architecture and the rationale for each mission element.

Requirement 15. Proposals shall describe the proposed mission design and mission operations concept.

Requirement 16. Proposals shall describe the proposed flight system concept, including the spacecraft bus and its major subsystems.

Requirement 17. Proposals shall describe the development approach for implementing the proposed mission within schedule and cost constraints, including a project schedule covering Phases A-F.



# Draft EVM-2 AO: Highlights

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## **5.2.4 New Technologies/Advanced Engineering Developments**

This AO solicits flight missions, not technology or advanced engineering development projects. Proposed investigations are generally expected to have mature technologies, with systems at a Technology Readiness Level (TRL) of 6 or higher. **For the purpose of TRL assessment, systems are defined as level 3 WBS payload developments (i.e., individual instruments) and level 3 WBS spacecraft elements (e.g., electrical power system); see Figure 3-7 of the *NASA WBS Handbook*, NASA/SP-2010-3404, which can be found in the EVM-2 Library.** TRLs are defined in NPR 7123.1B *NASA Systems Engineering Processes and Requirements*, Appendix E, which can be found in the EVM-2 Library.

Proposals with a limited number of less mature technologies and/or advanced engineering developments are permitted as long as they contain a plan for maturing these systems to TRL 6 (see NASA/SP-2007-6105 Rev 1, *NASA Systems Engineering Handbook*) by no later than PDR and adequate backup plans that will provide mitigation in the event that the systems cannot be matured as planned. The TRL state of systems may be validated by an independent team at PDR.

Requirement 22. Proposals that use systems currently at less than TRL 6 shall include a plan for system maturation to TRL 6 by no later than PDR and a backup plan in the event that the proposed systems cannot be matured as planned (see Appendix B, Section F, for additional detail).



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## **5.3 Management Requirements**

**Requirement 34.** A proposal shall identify and designate one, and only one, PI as the individual in charge of the proposed investigation.

**Requirement 35.** A proposal shall identify and designate one, and only one, PM as the individual charged with the responsibility for overseeing the technical and programmatic implementation of the proposed project. Proposals may optionally name a single Project Manager Alternate.

**Requirement 36.** A proposal shall identify and designate, one and only one, PSE as the individual responsible for the systems engineering process implementation of the proposed project.



# Draft EVM-2 AO: Highlights

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## **5.8.3 Classified Proposal Appendix regarding Heritage**

The use of a classified appendix regarding heritage is being permitted. NASA will endeavor to use the information in the classified appendix regarding heritage to better understand the proposed investigation. However, NASA cannot guarantee that this process will be fully successful in informing the review panel of the impact of a classified appendix regarding heritage that they have not read.

Requirement 80. Proposers that choose to submit a classified appendix regarding heritage shall submit the appendix and a cover letter to NASA Headquarters no later than the proposal due date. The proposer shall determine the appropriate security classification for the classified appendix, the proposer shall obtain any permission required for a reviewer to read the classified appendix, and the proposer shall ensure that all appropriate security requirements are followed in delivering the classified appendix to NASA Headquarters.





# Draft EVM-2 AO: Highlights

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## **A. PROPOSAL SUMMARY INFORMATION AND GRAPHIC COVER PAGE (App B)**

The proposal evaluation process requires evaluators be free of Conflict of Interest. In order to assist in planning of the proposal evaluation process, NASA requires a comprehensive list of proposed investigation participants.

Requirement B-11. With the proposal submission via NSPIRES, the proposers shall identify any institution that is specified in the proposal but that does not appear in either the “Team Member” section of the cover page or in answer to the question about “participants [...] who do not appear on the proposal’s cover page.” The proposer shall list the institution and division name, role (e.g., instrument component provider), and estimated real year dollars to be received. This information will be used to avoid financial and organizational conflicts of interest during the evaluation process by checking evaluators against institutions that are proposed to supply materials, parts, or services.



# TMC Evaluation



# TMC Evaluation

## Evaluation Criteria

### Evaluation Criteria:

- Scientific Merit of the Proposed Investigation
- Scientific Implementation Merit and Feasibility of the Proposed Investigation
- **TMC Feasibility of the Proposed Mission Implementation, including Cost Risk**

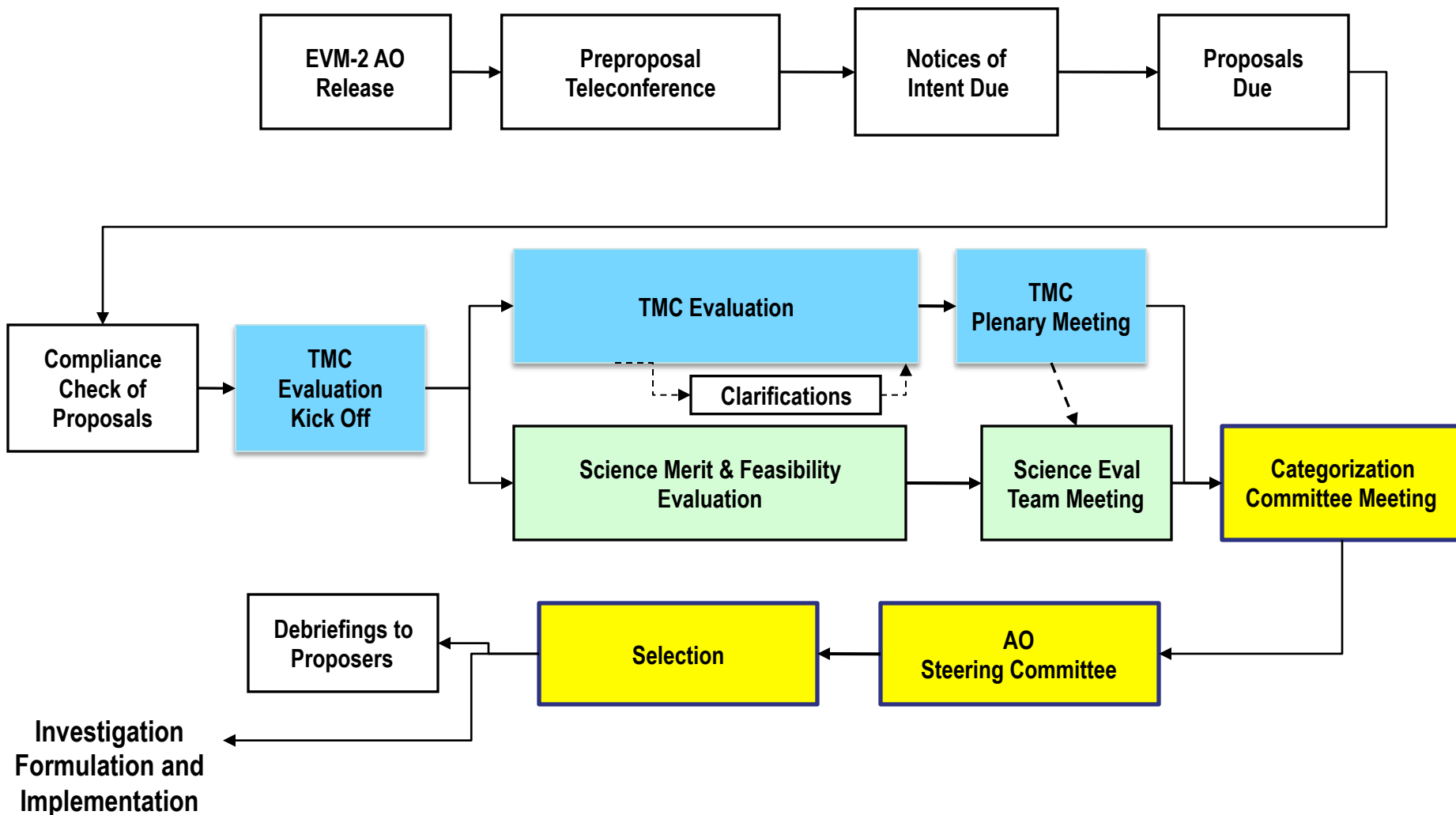
Weighting: the first criterion is weighted approximately 40%; the second and **third criteria are weighted approximately 30% each.**

**TMC Evaluation:** The technical and management approaches of all submitted investigations will be evaluated to assess the likelihood that they can be successfully implemented **as proposed**, including an assessment of the likelihood of their completion within the proposed cost and schedule.



# TMC Evaluation

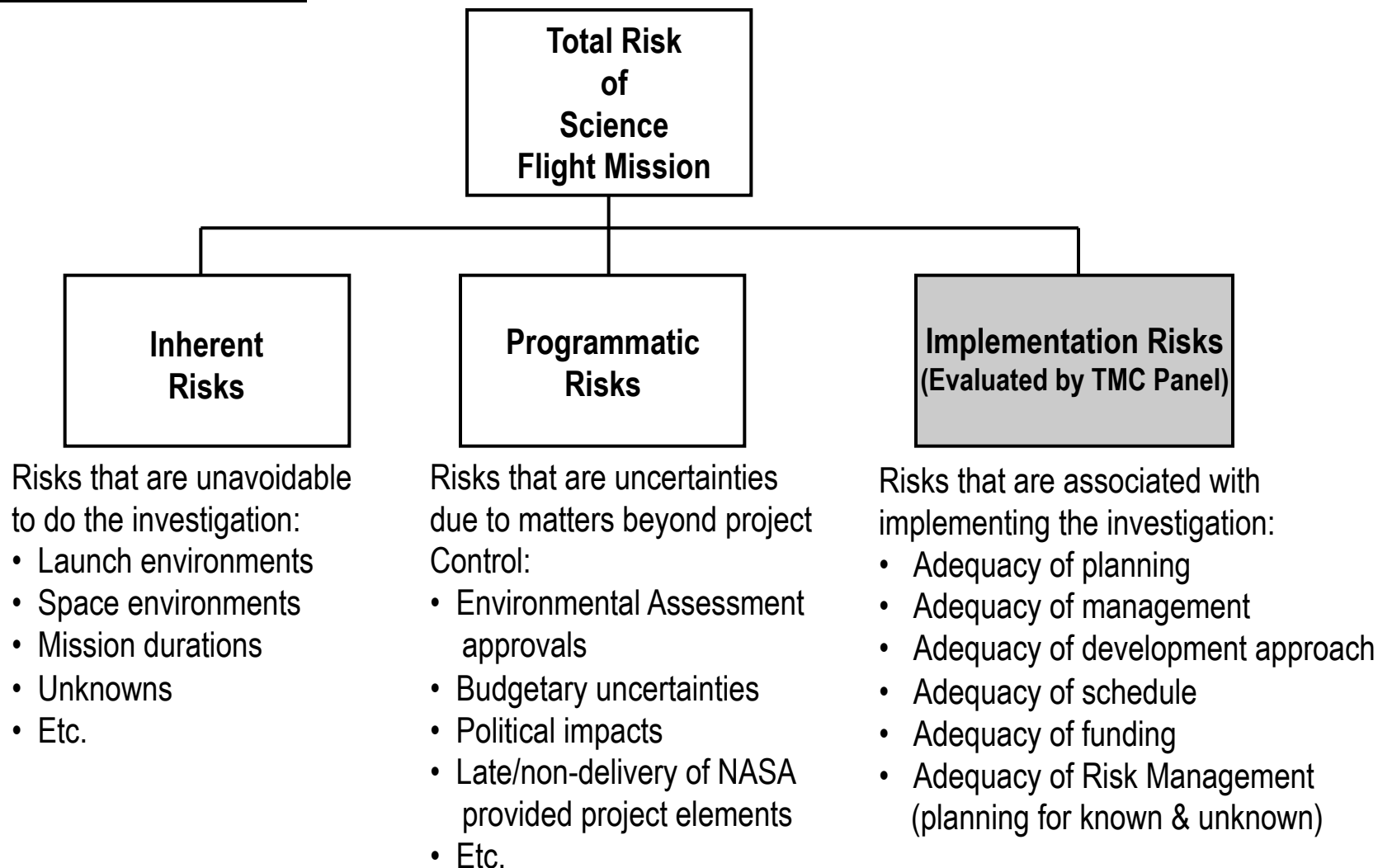
## Proposal Evaluation Flow





# TMC Evaluation

## What is evaluated?





# TMC Evaluation

## TMC Evaluation Purpose and Principles

**TMC evaluation purpose:** to assess the likelihood that the submitted investigations' technical and management approaches can be successfully implemented **as proposed**, including an assessment of the likelihood of their completion within the proposed cost and schedule.

- Basic Principles:
  - It is assumed that the proposer is the expert on his/her proposal.
  - Proposer's task is to demonstrate that the investigation implementation risk is low.
  - TMC panel's task is to try to validate proposer's assertion of low risk.
- Merit is to be assessed on the basis of material in the proposal. All Proposals are evaluated to identical standards and not compared to other proposals.
- TMC Panels consist of evaluators who are experts in the factors that they evaluate.
- TMC Panels develop findings for each proposal - Findings: "As expected" (no finding), "above expectations" (strengths), "below expectations" (weaknesses). Risk Ratings should reflect the written strengths and weaknesses.
- The Cost Analysis is integrated into overall Risk Rating.
- Proposal Risk Assessment: Proposals are based on Pre-Phase-A concepts; TMC Risk Assessments give appropriate benefit of the doubt to the Proposer.



# TMC Evaluation

## **TMC Evaluation Factors:**

*TMC Feasibility of the Proposed Mission Implementation, Including Cost Risk :*

Factor C-1. Adequacy and robustness of the instrument implementation plan.

Factor C-2. Adequacy and robustness of the mission design and plan for mission operations.

Factor C-3. Adequacy and robustness of the flight systems.

Factor C-4. Adequacy and robustness of the management approach and schedule, including the capability of the management team.

Factor C-5. Adequacy and robustness of the cost plan, including cost feasibility and cost risk.

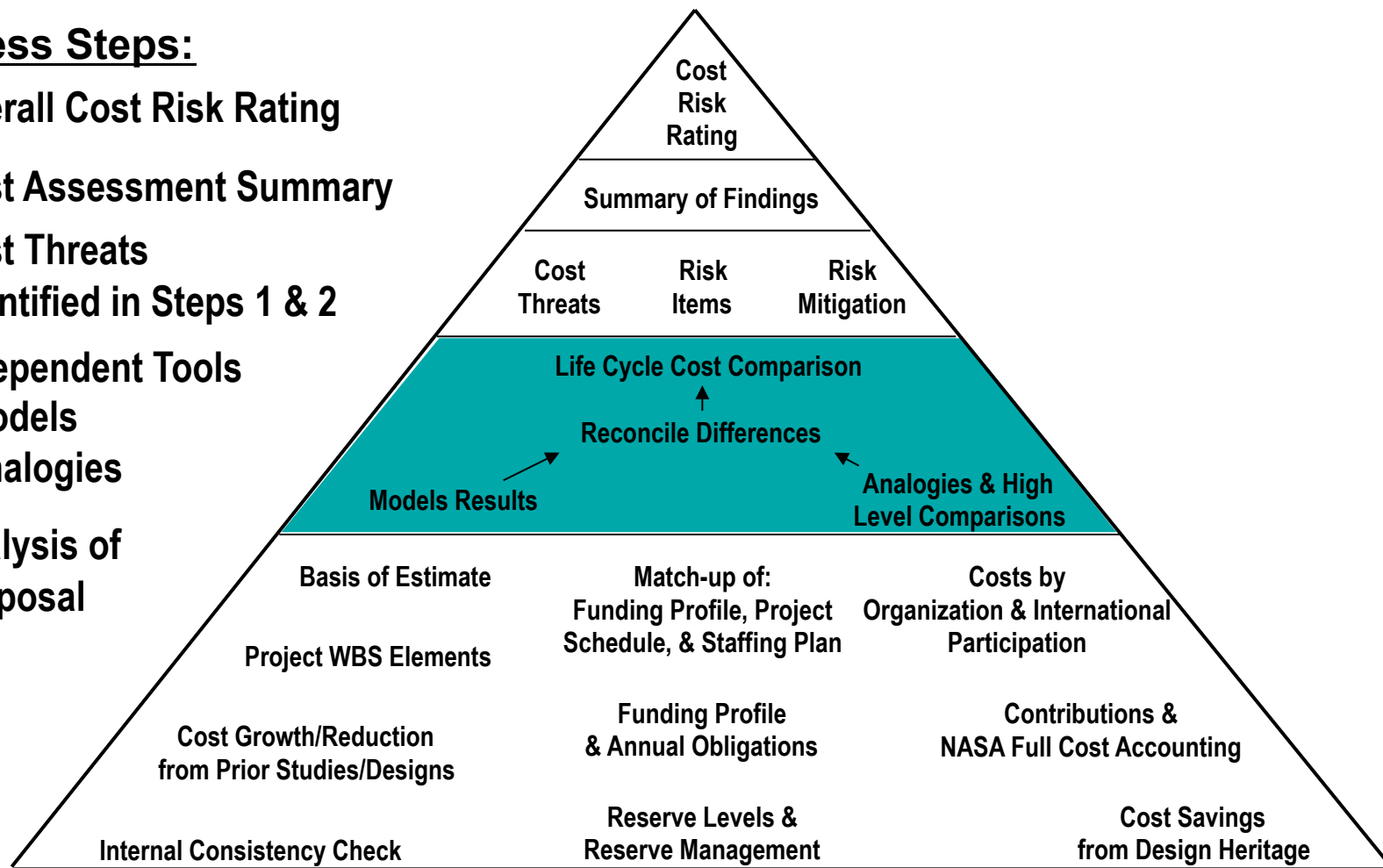


# TMC Evaluation

## TMC Cost Analysis: The Pyramid

### Process Steps:

5. Overall Cost Risk Rating
4. Cost Assessment Summary
3. Cost Threats  
identified in Steps 1 & 2
2. Independent Tools  
- Models  
- Analogies
1. Analysis of  
Proposal







# TMC Evaluation

## TMC Evaluation Findings

Major and minor strengths and weaknesses are defined as follows:

- **Major Strength:** A facet of the implementation response that is judged to be well above expectations and can substantially contribute to the ability of the project to meet its technical requirements on schedule and within cost.
- **Minor Strength:** A strength that is worthy of note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of risk.
- **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially weaken the project's ability to meet its technical objectives on schedule and within cost.
- **Minor Weakness:** A weakness that is sufficiently worrisome to note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of risk.

**Note:** Findings that are considered “as expected” are not documented.



# TMC Evaluation

## **TMC Evaluation Clarifications**

NASA will request clarification from proposers on potential major weaknesses and significant cost findings identified during the TMC Feasibility of the Investigation Implementation, including Cost Risk evaluation.

- NASA will request such clarification uniformly, from all proposers. PIs whose proposals have no potential major weaknesses or significant cost findings will receive an email informing them.
- All requests for clarification from NASA, and the proposer's response, will be in writing.
- The ability of proposers to provide clarification to NASA is extremely limited, as NASA does not intend to enter into discussions with proposers. The form of the clarifications is strictly limited to a few types of responses:
  - Identification of the locations in the proposal (page(s), section(s), line(s)) where the potential major weakness is addressed
  - Noting that the potential major weakness is not addressed in the proposal.
  - Stating that the potential major weakness is invalidated by information that is common knowledge and is therefore not included in the proposal.
  - Stating that the analysis leading to the potential major weakness is incorrect and identifying a place in the proposal where data supporting a correct analysis may be found.
  - Stating that a typographical error appears in the proposal and that the correct data is available elsewhere inside or outside of the proposal.

The PI will be given at least 24 hours to respond to the request for clarification. Any response that goes beyond a clarification will be deleted and will not be shown to the evaluation panel.



# TMC Evaluation

## TMC Evaluation Risk Ratings Definitions

**TMC Evaluation Purpose:** to assess the likelihood that the submitted investigations' technical and management approaches can be successfully implemented **as proposed**, including an assessment of the likelihood of their completion within the proposed cost and schedule.

Based on the narrative findings, each proposal will be assigned one of three Risk Ratings:

- **Low Risk:** There are no problems evident in the proposal that cannot be normally solved within the time and cost proposed. Problems are not of sufficient magnitude to doubt the Proposer's capability to accomplish the investigation well within the available resources.
- **Medium Risk:** Problems have been identified, but are considered within the proposal team's capabilities to correct within available resources with good management and application of effective engineering resources. Investigation design may be complex and resources tight.
- **High Risk:** One or more problems are of sufficient magnitude and complexity as to be deemed unsolvable within the available resources.

\*Note: Only Major Findings are considered in the Risk Rating.

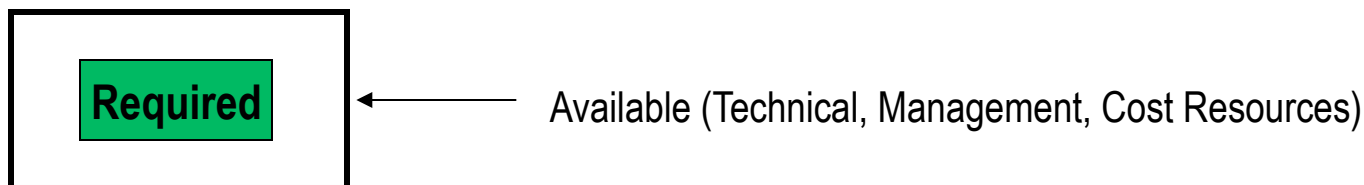


# TMC Evaluation

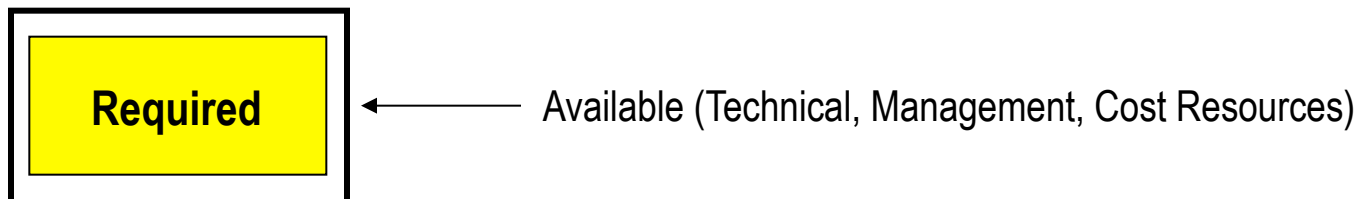
## TMC Evaluation Risk Ratings: Envelope Concept

**Envelope:** All TMC resources available to handle known and unknown development problems that occur. Includes schedule and funding reserves; reserves and margins on physical resources such as mass, power, and data; descope options; fallback plans; and personnel.

**Low Risk:** Required resources fit well within available resources



**Medium Risk:** Required resources just barely inside available resources.



**High Risk:** Required resources DO NOT fit inside available resources.





# References

## **EVM-2 Acquisition Homepage**

The EVM-2 Acquisition Homepage is found at <http://essp.larc.nasa.gov/EVM-2>

## **EVM-2 Library**

All reference documents are available at [http://essp.larc.nasa.gov/EVM-2/evm-2\\_library.html](http://essp.larc.nasa.gov/EVM-2/evm-2_library.html)

### **TRL 6 Examples document (New)**

Examples that provide possible scenarios where system level Technology Readiness Level (TRL) 6 is demonstrated. Proposing teams should address the requirement according to their investigation's unique system considerations, including stages of development.

### **EVI Common Causes of Major Weaknesses document**

Common causes of major weaknesses identified during the TMC evaluation of proposals submitted to EVI-1 solicitation. NASA is providing this service to assist the community to continually improve the quality of proposals.

### **TMC on Class C and Class D Payloads document**

Created to provide clarification to proposers on expectations TMC evaluators may have regarding Class D and C payloads. These expectations are in no way intended to be a comprehensive checklist on evaluating Class C and D (including CubeSat) proposals, and are intended to be supplementary and educational with the goal of assisting the proposers.



# Questions

## Questions

All questions pertaining to the draft EVM-2 AO

**MUST**

be addressed to:

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